

AUTHOR INDEX

- Abrameczyk, J., 168
 Ackerman, D. R., 145
 Altieri, Patricia L., 40
 Annear, D. I., 129

 Beck, G. E., 130
 Berggren, Ronald B., 94
 Berman, Sanford, 40
 Blackburn, Edward D., 19
 Blackshear, P. L., 265
 Brodine, Charles E., 65
 Brown, B. L., 249
 Bryan, Gordon H., 61
 Buckner, C. Dean, 136

 Calcott, P. H., 238
 Clater, Merlin, 27
 Cooper, T. E., 79, 183
 Coopwood, Thomas B., 243
 Cravalho, E. G., 191

 Deal, Paul H., 107
 Devin, Joseph, 163
 Diller, K. R., 191
 Dillingham, Lloyd A., 136
 Dry, Laurence R., 51

 Elford, B. C., 148

 Farrant, J., 56
 Feltz, Elmer T., 154
 Fennema, O., 223, 228
 Ferguson, J. Homer, 44
 Folk, G. Edgar, Jr., 44

 Gage, Andrew A., 1
 Gerrits, R. J., 141
 Giordano, Mary L., 179
 Greiff, Donald, 9
 Groenewald, J. H., 168, 174
 Groffinger, Albert, 40

 Halasz, Nicholas A., 163
 Hall, T. C., 130
 Hardner, G. J., 168
 Harris, G. C., Jr., 100, 209
 Heber, Ulrich, 71
 Hesse, V. E., 174
 Humphries, Arthur L., Jr., 129

 Ishikawa, Hiroshi, 1

 Johnson, L. A., 141
 Jung, G. A., 200

 Karow, Armand M., Jr., 122
 Kennedy, John H., 243
 Klebanoff, Gerald, 263
 Kollarits, Carol R., 94
 Kollarits, Frank J., 94

 Lani, K., 47
 Lehman, J. D., 249
 Lessler, Milton A., 94
 Liu, W. P., 122
 Lowenthal, Joseph P., 40

 Mackey, Shirley, 9
 Malinin, Theodore I., 65
 McCown, B. H., 130
 McLeester, R. C., 130
 Menno, Albert D., 179
 Meryman, H. T., 252
 Miller, Stephen H., 163
 Mohr, W. P., 113
 Murphy, G. P., 168, 174

 Nagle, S. C., Jr., 249

 Orlando, Michael M., 216
 Osteen, Robert T., 263

 Pace, William G., 19
 Panuska, J. A., 216
 Pegg, David E., 65
 Perry, Vernon P., 65
 Pfisterer, H., 47
 Pliskin, M., 256
 Postgate, J. R., 238
 Pursel, V. G., 141

 Ramazzotto, L. J., 256
 Rapatz, G., 157
 Rapp, C. D., 249
 Ritter, Donald G., 154
 Rochvarg, E., 256
 Rosenquist, T. H., 14
 Ruppelt, W., 47

 Santarius, Kurt A., 71
 Shih, S. C., 200
 Stein, M., 113
 Stich, W., 47
 Stone, David, 27
 Storb, Rainer, 136
 Sweeney, M. J., 209

 Thomas, E. Donnell, 136

Thomford, Neil R., 19
Thurston, R. J., 100
Trezek, G. J., 79, 183
Turner, M. D., 51

Van Hulle, G., 223, 228
Van Meter, Wayne P., 61

Wellman, A. M., 259
Wessling, F. C., 265
Wilson, Wayne H., 19
Winter, Peter M., 1
Woolgar, A. E., 56

Zacharian, Setrag A., 27

SUBJECT INDEX

- Activity
 - cytochrome oxidase, measure of effect of freezing on viability of heart muscle, 256
 - glutamic oxalacetic transaminase, distribution in semen after cold shock and freezing, 141
 - lactic dehydrogenase, distribution in semen after cold shock and freezing, 141
- Additives, cryoprotective, and hypertonic hemolysis, 56
- Aedes aegypti*, storage of cells under liquid nitrogen, 249
- Aedes albopictus*, storage of cells under liquid nitrogen, 249
- Aerobacter aerogenes*, protection by nonionic detergents from freezing and thawing damage, 238
- Agents, cryoprotective, and freeze-thaw injury, 100
- Amebas, soil, preservation by drying *in vacuo*, 129
- Aminopeptidases, assays to measure effects of freezing and storage at low temperatures on survival of isolated human blood platelets, 9
- Aqueous-organic systems, gas hydrates, 223, 228
- Bacterium, moderately halophilic, freeze-thaw behavior as function of salt concentration, 107
- Behavior, freeze-thaw, function of salt concentration, 107
- Bone marrow, long-term storage of cells at liquid nitrogen and Dry Ice temperatures, 65
- Calcium-45, uptake as measurement of freeze-thaw injury to spermatozoa in presence or absence of cryopreservatives, 100
- Cannula, cryogenic surgical, analytical prediction of temperature field emanating from, 79
- Cells
 - Aedes aegypti*, storage under liquid nitrogen, 249
 - Aedes albopictus*, storage under liquid nitrogen, 249
 - biological, cryomicroscope for study of freezing and thawing processes, 191
 - blood, apparatus for regulating freezing and thawing rates in cryopreservation, 47
 - bone marrow, long-term storage at liquid nitrogen and Dry Ice temperatures, 65
 - human red blood, effect of gases on recovery, 265
 - myocardial, ultrastructural changes in plasma membrane and sarcoplasmic reticulum during hibernation, 14
 - rapidly frozen red, absence of unfrozen freezable water, 252
- Cesium-137, comparison of lethal procedures, 61
- Cheek pouch, microcirculation, effects of cryogenic temperatures, 27
- Chemistry, of cold hardness in alfalfa, 200
- Cold hardness
 - chemistry in alfalfa when growth is regulated by chemicals, 200
 - of plants, influence of purines and pyrimidines, 200
- Cold shock, effect on distribution of glutamic oxalacetic transaminase and lactic dehydrogenase activities in semen, 141
- Concentration
 - electrolyte, and kinetics of inactivation of thaloid membranes, 71
 - protein, changes in seminal plasma after rapid freeze-thaw, 209
 - salt, and freeze-thaw behavior of bacterium, 107
- Critical thermal minimum, of small rodents in hypothermia, 44
- Cryomicroscope, for study of freezing and thawing processes in biological cells, 191
- Cryopreservation, of blood cells, apparatus for regulating freezing and thawing rates, 47
- Cryoprobe
 - cylindrical, rate of lesion growth around, 183
 - spherical, rate of lesion growth around, 183
- Cytochrome oxidase, activity, measure of effect of freezing on viability of heart muscle, 256
- Damage
 - freezing and thawing, protection of *Aerobacter aerogenes* by nonionic detergents, 238
 - ultrastructural, in parenchyma, 113
- Deacclimation, willow stem, enzyme changes, 130
- Detergents, nonionic, protection of *Aerobacter aerogenes* from freezing and thawing damage, 238
- Dimethyl sulfoxide
 - and functional recovery of smooth muscle, 148
 - influence on cardiovascular and respiratory function during hypothermia, 216
 - low temperature preservation of marrow, 136
- Drying, *in vacuo*, preservation of soil amebas, 129
- Electrolytes, high concentrations, kinetics of inactivation of thylakoid membrane, 71
- Enzyme, changes during deacclimation of willow stem, 130
- Ethylene oxide, effect in animal tissue, 228
- Ethylene oxide hydrate
 - effects in animal tissue, 228
 - formation and detection in tissue, 223

- Freeze-drying, strains of *Pasteurella pestis*, 40
- Freeze-thaw, rapid, effect on protein concentration of seminal plasma, 209
- Freezing
- and necrosis of kidneys, 122
 - and storage, effects at low temperatures on survival of isolated human blood platelets as measured by assays for aminopeptidases, 9
 - and thawing processes in biological cells, cryomicroscope, 191
 - and thawing rates, apparatus for regulating in cryopreservation of blood cells, 47
 - effect on distribution of glutamic oxalacetic transaminase and lactic dehydrogenase activities in semen, 141
 - effect on viability of heart muscle as measured by cytochrome oxidase activity, 256
 - hearts, associated problems, 157
 - kidneys, associated problems, 163
 - kinetics of inactivation of thylakoid membranes, 71
 - morphological changes in canine trachea, 19
- Freezing chamber, liquid nitrogen, auxiliary monitoring system, 154
- Frostbite, experimental, effect of hyperbaric oxygenation on tissue survival, 1
- Function
- cardiovascular, influenced by dimethyl sulfoxide, 216
 - respiratory, influenced by dimethyl sulfoxide, 216
- Gas hydrates, in aqueous-organic systems, 223, 228
- Gases, effect on recovery of human red blood cells, 265
- Glutamic oxalacetic transaminase, activity, distribution in semen after cold shock and freezing, 141
- Glycerol, metabolism, in spermatozoa, 145
- Growth rate, lesions, around spherical and cylindrical cryoprotectors, 183
- Growth regulation, by chemicals, analysis of chemistry of cold hardness of alfalfa, 200
- Heart
- freezing, associated problems, 154
 - muscle viability, effect of freezing as measured by cytochrome oxidase activity, 256
- Hemodilution, effects, 263
- Hemolysis, hypertonic, and cryoprotective additives, 56
- Hibernation, ultrastructural changes in plasma membrane and sarcoplasmic reticulum of myocardial cells, 14
- Hypothermia
- accidental, 243
 - cardiovascular and respiratory function, influence of dimethyl sulfoxide, 216
 - critical thermal minimum of small rodents, 44
 - effects, 263
- Inactivation, thylakoid membranes by freezing and high concentrations of electrolytes, kinetics, 71
- Injury
- freeze-thaw, calcium-45 as measure, 100
 - to spermatozoa, calcium-45 as measure in presence or absence of cryoprotective agents, 100
- Kidneys
- freezing, associated problems, 163
 - necrosis after freezing, 122
 - preservation, Silastic oxygenator and perfusion system, 51
 - survival after high pressure, 122
 - thawing, associated problems, 163
- Kidney Bank of Buffalo, 179
- Kinetics, of inactivation of thylakoid membranes by freezing and high concentrations of electrolytes, 71
- Lactic dehydrogenase, activity, distribution in semen after cold shock and freezing, 141
- Lesions, rate of growth around spherical and cylindrical cryoprotectors, 183
- Lethal procedures, comparison by cesium-137 assay, 61
- Liquid nitrogen storage
- of *Aedes aegypti* and *Aedes albopictus* cells, 249
 - oxygen utilization by skin exposed to cryoprotective solutions, 94
- Liver, preservation, Silastic oxygenator and perfusion system, 51
- Marrow, monkey, low preservation in dimethyl sulfoxide, 136
- Membranes, thylakoid, kinetics of inactivation by freezing and high concentrations of electrolytes, 71
- Metabolism, glycerol, in spermatozoa, 145
- Microcirculation, in cheek pouch, effects of cryogenic temperatures, 27
- Monitoring system, auxiliary, for liquid nitrogen freezing chamber, 154
- Morphology, changes in canine trachea after freezing, 19
- Necrosis, of kidneys after freezing, 122
- Oxygen, utilization by skin exposed to cryoprotective solutions during liquid nitrogen storage, 94
- Oxygenation, hyperbaric
- effects, 263
 - effect on tissue survival in experimental frostbite, 1

- Oxygenator, Silastic, and perfusion system for liver and kidney preservation, 51
- Parenchyma, protectively treated, frozen-thawed, ultrastructural damage, 113
- Pasteurella pestis*, freeze-drying attenuated strains, 40
- Penicillin, titer after storage of *Penicillium chrysogenum* by liquid nitrogen refrigeration, 259
- Penicillium chrysogenum*, penicillin titer after storage by liquid nitrogen refrigeration, 259
- Perfusates, for renal preservation, *in vivo* evaluation, 168
- Perfusion system, and Silastic oxygenator, for liver and kidney preservation, 51
- Plants, cold hardiness, influence of purines and pyrimidines, 200
- Plasma membrane, of myocardial cells, ultrastructural changes during hibernation, 14
- Platelets, isolated human blood, effects of freezing and storage on survival as measured by assays for aminopeptidases, 9
- Preservation
 kidney, Silastic oxygenator and perfusion system, 51
 liver, Silastic oxygenator and perfusion system, 51
 low temperature, in dimethyl sulfoxide, 136
 of soil amebas by drying *in vacuo*, 129
 renal, evaluation of perfusates, 168
- Preservation unit, renal, preliminary results, 174
- Pressure, high, effect on survival of kidneys, 122
- Protection, of *Aerobacter aerogenes*, by nonionic detergents from freezing and thawing damage, 238
- Protein, concentration, changes in seminal plasma after rapid freeze-thaw, 209
- Purines, influence on cold hardiness of plants, 200
- Pyrimidines, influence on cold hardiness of plants, 200
- Recovery
 functional, of smooth muscle after exposure to dimethyl sulfoxide and low temperatures, 148
 human red blood cells, effect of gases, 265
- Refrigeration, liquid nitrogen, penicillin titer after storage of *Penicillium chrysogenum*, 259
- Salt, concentration, and freeze-thaw behavior of bacterium, 107
- Sarcoplasmic reticulum, of myocardial cells, ultrastructural changes during hibernation, 14
- Semen, distribution of glutamic oxalacetic transaminase and lactic dehydrogenase activities after cold shock and freezing, 141
- Seminal plasma, changes in protein concentration after rapid freeze-thaw, 209
- Smooth muscle, functional recovery after exposure to dimethyl sulfoxide and low temperatures, 148
- Solutions, cryoprotective, oxygen utilization by skin during liquid nitrogen storage, 94
- Spermatozoa
 freeze-thaw injury, calcium-45 as measure in presence or absence of cryoprotective agents, 100
 untreated, cold-shocked, and frozen, glycerol metabolism, 145
- Storage
 and freezing, effects at low temperatures on survival of isolated human blood platelets as measured by assays for aminopeptidases, 9
 liquid nitrogen, oxygen utilization by skin exposed to cryoprotective solutions, 94
 long-term, of bone marrow cells at liquid nitrogen and Dry Ice temperatures, 65
 of *Aedes aegypti* cells, under liquid nitrogen, 249
 of *Aedes albopictus* cells, under liquid nitrogen, 249
- Survival
 isolated human blood platelets, effects of freezing and storage at low temperatures as measured by assays for aminopeptidases, 9
 kidneys subjected to high pressures, necrosis of kidneys after freezing, 122
 tissue, effect of hyperbaric oxygenation in experimental frostbite, 1
- Temperature
 cryogenic, effects on microcirculation in cheek pouch, 27
 Dry Ice, long-term storage of bone marrow cells, 65
 liquid nitrogen, long-term storage of bone marrow cells, 65
 low
 effects of freezing and storage on isolated human blood platelets, 9
 effect on functional recovery of smooth muscle, 148
 preservation of monkey marrow in dimethyl sulfoxide, 136
 Temperature field, emanating from cryogenic surgical cannula, analytical prediction, 79
- Thawing, kidneys, associated problems, 163
- Tissue
 animal, effects of ethylene oxide and ethylene oxide hydrate, 228
 survival, effect of hyperbaric oxygenation in experimental frostbite, 1

- Titer, penicillin, after storage of *Penicillium chrysogenum* by liquid nitrogen refrigeration, 259
- Trachea, morphological changes after freezing, 19
- Ultrastructure, changes in plasma membrane and sarcoplasmic reticulum of myocardial cells during hibernation, 14
- Uptake, calcium-45, measurement of freeze-thaw injury to spermatozoa in presence or absence of cryoprotective agents, 100
- Utilization, oxygen, by skin exposed to cryoprotective solutions during liquid nitrogen storage, 94
- Viability, of heart muscle, effect of freezing as measured by cytochrome oxidase activity, 256
- Water, unfrozen freezable, absence in rapidly frozen red cells, 252
- Willow stem, enzyme changes during deacclimation, 130

CRYOBIOLOGY

EDITORIAL BOARD

WILLIAM M. ABBOTT
HENDRICK B. BARNER
ARTHUR B. CALLAHAN
CLEMENT W. COWLEY
LOUIS S. DIAMOND
VIRGINIA J. EVANS
OWEN FENNEMA
G. EDGAR FOLK, JR.
ROWDON M. FRY
ISIDORE GERSCH
GEORGE O. GEY
FRANK GOLLAN
DONALD GREIFF
IAN W. D. HENDERSON
THOMAS D. KELLAWAY
PETER MAZUR
JOSEPH L. MELNICK

HAROLD T. MERYMAN
THOMAS NASH
TOKIO NEI
EMANUEL PALADINI
JOSEPH A. PANUSKA
GABRIEL L. RAPATZ
ARTHUR W. ROWE
ALBERT J. ROY
ROBERT SCHREK
KENNETH W. SELL
JOHN E. SHANNON
SIDNEY SHULMAN
DAVID SIMINOVITCH
FRANK E. SOUTH, JR.
HAROLD L. STEWART
FRANK E. TROBAUGH, JR.
MONROE M. VINCENT

Editor-in-Chief: THEODORE I. MALININ

Associate Editor: VERNON P. PERRY

Abstracts Editor: ARTHUR ROWE

Volume 7, 1970-1971

SOCIETY FOR CRYOBIOLOGY

Copyright © 1971

VOLUME CONTENTS

No. 1, July-August 1970

Experimental Frostbite. The Effect of Hyperbaric Oxygenation on Tissue Survival Andrew A. Gage, Hiroshi Ishikawa, and Peter M. Winter	1
Cryobiology of Platelets. II. The Effects of Freezing and Storage at Low Temperatures on the Survival of Isolated Human Blood Platelets as Measured by Assays for AminopeptidasesDonald Greiff and Shirley Mackey	9
Ultrastructural Changes in the Plasma Membrane and Sarcoplasmic Reticulum of Myocardial Cells during HibernationT. H. Rosenquist	14
Morphological Changes in Canine Trachea after Freezing Neil R. Thomford, Wayne H. Wilson, Edward D. Blackburn and William G. Pace	19
Effects of Cryogenic Temperatures on Microcirculation in the Golden Hamster Cheek PouchSetrag A. Zacarian, David Stone, and Merlin Clater	27

BRIEF COMMUNICATIONS

Freezing-Drying Various Attenuated Strains of <i>Pasteurella pestis</i> Sanford Berman, Patricia L. Altieri, Albert Groffinger, and Joseph P. Lowenthal	40
The Critical Thermal Minimum of Small Rodents in Hypothermia J. Homer Ferguson and G. Edgar Folk, Jr.	44
An Apparatus for Regulating the Freezing and Thawing Rates in the Cryopreservation of Blood CellsW. Ruppelt, H. Pfisterer, K. Lani, and W. Stich	47
Silastic Oxygenator and Perfusion System for Canine Liver and Kidney Preservation M. D. Turner and Laurence R. Dry	51
Cryoprotective Additives and Hypertonic HemolysisJ. Farrant and A. E. Woolgar	56
A Comparison of Lethal Procedures by Cesium-137 Assay Gordon H. Bryan and Wayne P. Van Meter	61
Long-Term Storage of Bone Marrow Cells at Liquid Nitrogen and Dry Ice Temperatures ...Theodore I. Malinin, David E. Pegg, Vernon P. Perry, and Charles E. Brodine	65

No. 2-3, September-October 1970

The Kinetics of the Inactivation of Thylakoid Membranes by Freezing and High Concentrations of ElectrolytesKurt A. Santarius and Ulrich Heber	71
Analytical Prediction of the Temperature Field Emanating from a Cryogenic Surgical CannulaT. E. Cooper and G. J. Trezek	79
Oxygen Utilization by Rat Skin Exposed to Several Cryoprotective Solutions during Liquid Nitrogen Storage Carol R. Kollarits, Milton A. Lessler, Ronald B. Berggren, and Frank J. Kollarits	94
Calcium-45 Uptake as a Measurement of Freeze-Thaw Injury to Chicken Spermatozoa in the Presence or Absence of Cryopreservatives R. J. Thurston and G. C. Harris, Jr.	100
Freeze-Thaw Behavior of a Moderately Halophilic Bacterium as a Function of Salt ConcentrationPaul H. Deal	107
Ultrastructural Damage in "Protectively" Treated, Frozen-Thawed, Tomato Fruit ParenchymaW. P. Mohr and M. Stein	113
Survival of Dog Kidneys Subjected to High Pressures: Necrosis of Kidneys after FreezingArmand M. Karow, Jr., W. P. Liu, and Arthur L. Humphries, Jr.	122

BRIEF COMMUNICATIONS

A Note on the Preservation of Soil Amebas by Drying in <i>Vacuo</i>D. I. Annear	129
Enzyme Changes during Deacclimation of Willow Stem T. C. Hall, R. C. McLeester, B. H. McCown, and G. E. Beck	130
Low Temperature Preservation of Monkey Marrow in Dimethyl Sulfoxide C. Dean Buckner, Rainer Storb, Lloyd A. Dillingham, and E. Donnell Thomas	136

Distribution of Glutamic Oxalacetic Transaminase and Lactic Dehydrogenase Activities in Boar Semen after Cold Shock and Freezing	
	V. G. Pursel, L. A. Johnson, and R. J. Gerrits 141
Glycerol Metabolism in Untreated, Cold-shocked, and Frozen Human Spermatozoa	
	D. R. Ackerman 145
Functional Recovery of Smooth Muscle after Exposure to Dimethyl Sulfoxide and Low Temperatures	
	B. C. Elford 148
Auxiliary Monitoring System for a Liquid Nitrogen Freezing Chamber	
	Elmer T. Feltz and Donald G. Ritter 154
CRYOPRESERVATION CONFERENCE	
Some Problems Associated with the Freezing of Hearts	G. Rapatz 157
Some of the Problems Associated with the Freezing and Thawing of Kidneys	
	Nicholas A. Halasz, Stephen H. Miller, and Joseph Devin 163
An <i>in Vivo</i> Evaluation of Various Perfusates Employed in Renal Preservation	
	G. J. Hardner, J. H. Groenewald, J. Abramczyk, and G. P. Murphy 168
Preliminary Results with a New Renal Preservation Unit	
	V. E. Hesse, J. H. Groenewald, and G. P. Murphy 174
The Operation of the Kidney Bank of Buffalo	
	Albert D. Menno and Mary L. Giordano 179
No. 4-6, November-December 1970	
Rate of Lesion Growth around Spherical and Cylindrical Cryoprobe	
	T. E. Cooper and G. J. Trezek 183
A Cryomicroscope for the Study of Freezing and Thawing Processes in Biological Cells	K. R. Diller and E. G. Cravalho 191
Influence of Purines and Pyrimidines on Cold Hardiness of Plants. IV. An Analysis of the Chemistry of Cold Hardiness in Alfalfa When Growth Is Regulated by Chemicals	S. C. Shih and G. A. Jung 200
Changes in the Protein Concentration of Chicken Seminal Plasma after Rapid Freeze-Thaw	G. C. Harris, Jr., and M. J. Sweeney 209
Cardiovascular and Respiratory Function of Hypothermic Rabbits, as Influenced by Dimethyl Sulfoxide	Michael M. Orlando and J. A. Panuska 216
Gas Hydrates in Aqueous-Organic Systems. IV. Formation and Detection of Ethylene Oxide Hydrate in Tissue	G. Van Hulle and O. Fennema 223
Gas Hydrates in Aqueous-Organic Systems. V. Effects of Ethylene Oxide and Ethylene Oxide Hydrate in Animal Tissue	G. Van Hulle and O. Fennema 228
BRIEF COMMUNICATIONS	
Protection of <i>Aerobacter aerogenes</i> by Nonionic Detergents from Freezing and Thawing Damage	P. H. Calcott and J. R. Postgate 238
Accidental Hypothermia	Thomas B. Coopwood and John H. Kennedy 243
Storage of <i>Aedes aegypti</i> and <i>Aedes albopictus</i> Cells under Liquid Nitrogen	
	B. L. Brown, S. C. Nagle, Jr., J. D. Lehman, and C. D. Rapp 249
Absence of Unfrozen Freezable Water in Rapidly Frozen Red Cells	H. T. Meryman 252
The Effect of Freezing on the Viability of Rat Heart Muscle as Measured by Cytochrome Oxidase Activity	L. J. Ramazzotto, M. Pliskin, and E. Rochvarg 256
Penicillin Titer after Storage of <i>Penicillium chrysogenum</i> by Liquid Nitrogen Refrigeration	A. M. Wellman 259
The Effects of Hemodilution, Hypothermia, and Hyperbaric Oxygenation on Intact Dogs	Robert T. Osteen and Gerald Klebanoff 263
The Effects of Gases on the Recovery of Human Red Blood Cells	
	F. C. Wessling and P. L. Blackshear 265
AUTHOR INDEX	275
SUBJECT INDEX	277
VOLUME CONTENTS	iii

